144648

MONSANTO PROPOSAL

SAUGET AREA 1
ILLINOIS SITE REMEDIATION PROGRAM

Sauget, Illinois

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1.0 INTRODUCTION

Sauget Area 1 consists of nine sites in the Village of Sauget, Illinois, the individual site segments of Dead Creek, impoundments and landfills. Figure 1.1 locates Sauget Area 1 and the nine individual sites within Area 1.

Studies within Sauget Area 1 have identified constituents of concern consisting of polychlorinated biphenyls (PCBs), a variety of other organic compounds and heavy metals. Constituents of concern have been identified within Dead Creek, impoundment sediments, landfills and groundwater.

In 1996, the Illinois Environmental Protection Agency (IEPA) prepared a Hazard Ranking System (HRS) scoring package for Sauget Area 1 and nominated the Site for addition to the National Priorities List (NPL). United States Environmental Protection Agency (USEPA) is currently reviewing comments on the HRS scoring package.

Monsanto has met over recent months with USEPA and IEPA to evaluate the possibility of addressing Sauget Area 1 under the voluntary Illinois Site Remediation Program (SRP) rather than under Superfund. At the September 17, 1996 meeting with USEPA, Monsanto was advised that IEPA would be the primary agency to manage any necessary remediation of Sauget Area 1. At the October 9, 1996 meeting between Monsanto and the IEPA in Springfield, Illinois, Monsanto expressed their interest in taking a leadership role for Sauget Area 1 under the SRP and asked whether IEPA would consider a proposal from Monsanto to address Sauget Area 1. IEPA encouraged Monsanto to prepare a proposal which would describe how Monsanto would manage the project under the SRP. IEPA also identified potential implementation concerns such as access to non-Monsanto property, orphan sources and coordination with other parties (such as Cerro Copper).

On November 12, 1996, Monsanto and IEPA met again to discuss the technical aspects of Area 1 and the concepts of Monsanto's proposal. IEPA stated at that meeting, and within a subsequent letter of November 14,

1996, their desire to develop a consent decree for the work which would include a commitment by Monsanto to implement the entire remedy for Area 1.

This proposal presents Monsanto's plan to address Sauget Area 1 under the SRP rather than Superfund. Monsanto's proposal addresses all nine sites identified by IEPA and includes a comprehensive program to characterize Area 1. The proposal does not include a commitment for remediation at this time. This does not mean that Monsanto is unwilling to conduct remediation, but simply means that Monsanto wants to focus on completing the data collection to characterize Area 1 and to develop a remedial program. Once a remedial program has been developed and approved by the IEPA, Monsanto will discuss implementation of the remedial program with IEPA.

This proposal also addresses issues raised by IEPA with regard to access, orphan sources, other responsible parties and historically incurred costs.

2.0 BACKGROUND

This section provides a summary of each of the following sources which comprise Sauget Area 1:

- Creek Segment A
- Creek Segment B
- Creek Segments C through E
- Site G (Landfill)
- Site H (Landfill)
- Site I (Landfill)
- Site L (Backfilled Impoundment)
- Site M (Impoundment)
- Site N (Landfill)

Figure 1.1 locates each of the nine sites.

This section also presents a history of Sauget Area 1. Information presented herein was primarily obtained from Geraghty & Miller, 1992; Ecology & Environment (E&E), 1988 and the HRS scoring package.

2.1 CREEK SEGMENT A

Creek Segment A is an approximately 1800 feet long section of Dead Creek, near the Monsanto W. G. Krummrich manufacturing facility and east of the Cerro Copper manufacturing facility (see Figure 1.1). The segment is bounded to the south by Queeny Avenue. The width of the creek area is estimated to be approximately 100 feet, although recent remediation by Cerro Copper has completely modified the original configuration of the creek.

Reportedly, this segment contained shallow "ponds" which received stormwater run-off. In addition, disposal and discharges were reported to have entered this segment of the creek prior to 1970. In 1970 the culvert under

Queeny Avenue was blocked and the ponds in Creek Segment A were regraded to divert flow to the north.

The primary constituents of concern within the sediments of Creek Segment A include the following:

- Organic Constituents: PCBs, methylphenols, chlorobenzenes, aliphatic hydrocarbons, chloroaniline, and phenols, and the following inorganic constituents; and

- Inorganic Constituents: phosphorus, zinc, arsenic, cadmium, chromium, lead and mercury.

The sediments ranged in thickness from 0.5 to 11 feet.

Remediation has taken place along Creek Segment A. Cerro Copper excavated and removed approximately 20,000 cubic yards of impacted sediments and disposed of the material at off-Site permitted landfills. The former creek area was backfilled and Cerro Copper modified their stormwater drainage system to prevent future discharges to this segment of Dead Creek.

2.2 CREEK SEGMENT B

Creek Segment B is a section of Dead Creek extending approximately 1,950 feet from Queeny Avenue south to Judith Lane (see Figure 1.1). The width of this creek segment varies and is reported to be between 5 and 56 feet wide with heavily-vegetated banks.

Creek Segment B received direct discharge from Midwest Rubber Company from the late 1940's to the early 1960's through an 18-inch outfall located approximately 200 feet south of Queeny Avenue. Creek Segment B also received discharge from the Waggoner Trucking Company until 1971 when Waggoner constructed Surface Impoundment L to contain the company's washwater.

E&E conducted a limited investigation of the northern and southern portions of this creek segment in 1986. In 1991, Geraghty & Miller conducted a more detailed investigation by advancing three borings along each of ten profiles across the entire length of the creek (except the northern 450 feet due to access) for a total of 30 locations. Selected sediment samples from each profile were analyzed for Target Compound List (TCL)/Target Analyte List (TAL) parameters and the remainder of samples from each profile were analyzed for TCL PCBs and TAL metals. In addition, four separate composite samples were analyzed for Toxicity Characteristic Leachate Procedure (TCLP) parameters.

The principal constituents of concern within Creek Segment B sediments include: PCBs, carbon disulfide, chlorobenzene, benzo(b)fluoranthene, antimony, arsenic, barium, copper, lead, mercury, nickel, selenium, and zinc.

PCBs were the predominant constituents of concern with the highest concentrations detected within the upper 2 feet of sediment. The volume of material estimated in the upper 2 feet of sediment is approximately 3,330 cubic yards.

No remedial activities have taken place to date for Creek Segment B. However, access to this creek segment is currently restricted with an 8-foot high chain link fence that also encompasses Surface Impoundment M - Hall Excavation Pit.

2.3 CREEK SEGMENTS C TO E

Creek Segments C through E extend from Judith Avenue on the north to the culvert at State Route 3 (see Figure 1.1).

Dead Creek Segment CS-C is bordered on the north by Judith Lane and on the south by Cahokia Street. It is approximately 1300 feet in

length and 75 feet wide. Dead Creek Segment CS-D is bordered on the north by Cahokia Street and on the south by Jerome Street. It is approximately 1100 feet in length and 75 feet wide. Dead Creek Segment CS-E is bordered on the north by Jerome Street and extends to the south to the park at State Route 3 and 157. It is approximately 3500 feet in length and 75 feet wide.

Creek Segments C through E have been impacted by the downstream migration of constituents of concern from the north. These creek segments are generally wider and contain more water. They are bordered primarily by residential property. Surface water flows from one segment to the other via culverts under the roads separating each segment.

A limited number of sediment samples collected within these segments of Dead Creek have shown concentrations of PCBs ranging from 0.12 to 28 mg/kg. Inorganic constituents of concern include lead, copper, nickel and zinc. Surface water samples collected within these segments of Dead Creek have not indicated constituents of concern (PCBs, chlorobenzenes, chlorophenols, PNAs, pentachlorophenol and metals) at levels similar to those identified in upstream segments.

No remedial activities have taken place along Creek Segments C through E. The creek segments comprising Creek Segments C through E are generally free to public access and appear to support normal vegetative growth and biological habitats.

2.4 SITE G - LANDFILL

Site G is a landfill located just south of Queeny Avenue immediately west of Creek Segment B (Figure 2.1). Site G operated as a landfill from approximately 1950 until 1973 and occupies approximately 4.5 acres immediately east of Wiese Engineering Company. Little information is currently available on the operation of the Site prior to landfilling but based on waste thicknesses and historical photographs, the Site may formerly have been a sand borrow pit.

The surface of the site is littered with demolition debris and metal waste as well as corroded 55-gallon drums and two pits of oily wastes. A large depression exists in the south-central portion of the Site. Where the debris is covered, fly-ash and cinder material was used as cover.

E&E conducted magnetometer and electromagnetic induction surveys in 1985 and 1986. The results showed a high likelihood of buried metal across the Site. Data on subsurface materials were collected through a series of approximately 12 soil borings completed across the Site by E&E in 1983. The fill material consists of sandy, silty clay mixed with cinders, slag and occasional gravel and appears to increase in depth from east to west across the Site from 3 to 12 feet thick. This material is cover for the underlying waste which consists of black oily sludge, refuse and uncharacterized waste to a maximum depth of 25 feet. The average depth of waste is approximately 16 feet and is found beneath the water table. The approximate volume of waste within Site G is 60,000 cubic yards.

The primary constituents of concern within Site G include PCBs, naphthalene, benzene, toluene, ethylbenzene, xylenes, chlorobenzenes, phenol compounds, and metals including lead and arsenic.

Interim remedial activities have taken place to date at Site G. consisting of an 8-foot high chain link fence installed by IEPA in 1987. In 1995, USEPA consolidated soils containing dioxin and constructed a cap over Site G.

2.5 SITE H - LANDFILL

Site H is located at the southwest corner of Queeny Avenue and Falling Springs Road, just east of Dead Creek (Figure 2.1). This site was originally a sand and gravel borrow pit which extended to the north of Queeny Avenue into what is termed herein as Landfill I. The former sand and gravel pit was used for disposal of construction debris and industrial wastes. Waste disposal activities reportedly occurred from 1944 to 1957.

The total estimated area of the landfilled portion of Site H has been reported to be from 5 to 9 acres. The total depth of landfill may be as great as 35 feet or more, with an average depth of landfilled wastes approximately 20 feet. The upper 5 to 13 feet of material at Site H is fill comprising silty clays and crushed limestone. Beneath this fill is landfilled material comprising solids, sludges, oily refuse, drums of chemicals, municipal wastes and construction debris. The sand and gravel pit was excavated during a time period when the regional water table was much lower due to large pumping centers north of the site. After the pit had been filled with wastes, the water table recovered to normal depths and saturated the landfilled wastes. Consequently, much of the wastes at Site H are found below the water table.

Wastes reportedly disposed of in the landfill include drums of solvents, other organics and inorganics. These included PCBs, para-nitro -aniline, chlorine, phosphorous pentasulfide, hydrofluosilic acid and others. Municipal wastes were also reportedly dumped at this site. An estimate of over 110,000 cubic yards of wastes has been indicated in past studies for Site H.

Primary constituents of concern measured in soils and groundwater at Site H include PCBs, chlorophenol, cyclohexanone, trichlorobenzene, dichlorobenzenes, phenathrene, benzo(a)pyrene, 2,4 dichlorophenol, arsenic, copper, nickel and other metals.

Studies completed at Site H have included 11 deep soil borings and installation and sampling of five monitoring wells by E&E in 1987.

No remediation has taken place at Site H with the exception of placement of cover material consisting of crushed limestone in areas where commercial facilities exist.

2.7 SITE L - BACKFILLED IMPOUNDMENT

Site L is located approximately 500 feet south of Site I adjacent to Creek Segment B (Figure 2.2). The site was excavated to a depth of approximately 8 feet and used as a disposal impoundment from approximately 1971 to 1978. Washwaters from industrial waste hauling trucks were discharged to this impoundment during this time period. Prior to this, from approximately 1964 to 1971, washwaters were discharged directly to Creek Segment B. The Site is currently filled and covered with cinders and used to store large machinery.

E&E drilled four soil borings to characterize conditions at Site L in 1988. Data from the borings indicate that the former impoundment was excavated approximately 8 feet into material chiefly composed of sand with silt. The excavation was backfilled with material consisting of black cinders, clay and concrete. The contact between the fill material and underlying sand and silt deposits is believed to be an indication of the extent of the former impoundment. Constituents of concern include benzene, toluene, phenols and arsenic. PCBs were not detected by E&E.

Geraghty and Miller, Inc. conducted a supplemental soil boring program at Site L in 1991. Approximately 17 borings were advanced to determine maximum fill thickness and to characterize the fill. Selected composite samples were collected from the center of the former impoundment and analyzed for TCL/TAL and TCLP parameters. Selected discrete samples were collected from perimeter borings and analyzed for TCL VOCs, TCL SVOCs and TAL metals. Constituents of concern detected include 1,2,4-trichlorobenzene, dichlorobenzene, PCBs (ranging from 500 mg/kg to 16 mg/kg), arsenic and zinc.

The volume of PCB-impacted fill material was not determined since only a limited number of samples were analyzed for PCBs. PCB-impacted soil likely extends below the fill. The area of the impoundment was calculated to be approximately 7600 square feet.

No remedial activities have taken place to date at Site L and access is currently unrestricted.

2.8 SITE M - SURFACE IMPOUNDMENT

Site M is located immediately east of Dead Creek approximately 300 feet north of Judith Lane at the end of Walnut Avenue (see Figure 2.3). Site M was a sand borrow pit excavated in the 1940s by H.H. Hall Construction Company. The pit was mined prior to any residential development along Walnut Avenue. The pit dimensions are approximately 220 feet by 320 feet and water in the pit is presently up to 14 feet deep. The pit is likely in hydraulic communication with underlying groundwater. The pit is connected to Creek Segment B by a drainageway or cut-through, located in the southwest corner of the pit. This drainageway is approximately 8 feet wide and allows flow between Creek Segment B and the pit. The east bank of the pit has miscellaneous trash and debris. Other than the miscellaneous, there is no apparent evidence of waste disposal to the pit.

In 1986, E&E collected two surface water samples and five sediment samples at Site M. The primary constituents of concern detected in sediments were PCBs. However, it is not clear whether Site M was a disposal area or whether it was impacted by surface water drainage from Dead Creek.

In 1991, Geraghty & Miller conducted a study to supplement E& E's data. Forty-four sediment thickness measurements were collected to determine the thickness and volume of sediments in the bottom of the pit. Sediment thickness ranged from 0.5 feet to 5.5 feet.

Initially, three sediment samples were analyzed for TCL PCBs and TAL metals. One of the three samples was analyzed for full TCL/TAL parameters and one composite sample of the three was analyzed for TCLP parameters. Seven additional samples were later collected from the upper one foot of sediment for TCL PCB analysis.

The primary constituents of concern detected by Geraghty & Miller at Site M included: PCBs (from 14.9 to 505 mg/kg), chlorobenzene, ethylbenzene, 1,2-dichlorobenzene, 1,4-dichlorobenzene, antimony, arsenic, barium, copper, lead, nickel and zinc.

Profile thickness measurements indicate that approximately 3,600 cubic yards of sediment have been impacted by PCBs.

No remedial activities have taken place to date at Site M and access is currently unrestricted where Walnut Street dead ends at the pit.

2.9 SITE N - LANDFILL

Site N is located adjacent to Creek Segment C (Figure 2.4). The Site is located on property occupied in the past by the H. H. Hall Construction Co. which extended from Dead Creek on the west to Falling Springs Road on the east. Site N covers less than 7 acres, although its total area has been reported to range from 4 to 7 acres. It is bordered on the north and south by residential properties.

The Site was developed initially as a borrow pit prior to 1950. This pit extended to the water table. The sands and gravels excavated were used for road construction. Later, H. H. Hall Construction Co. reportedly used the pit for disposal of construction debris such as concrete rubble, scrap wood, and other demolition debris. The cover material currently consists of rubble and the area was used to store equipment at one time.

The depth of the original excavation is unknown as only two soil borings have been completed at the site. However, based upon other excavations, the depth of Site N may have been as much as 30 feet. No industrial or chemical wastes are documented as being disposed of at this Site. Chemical data collected from the two soil borings indicated only low concentrations of PNAs (less than 1 ppm).

No remedial activities have been completed at Site N. Access to the Site is currently restricted through a chain link fence, although the fence appears to be in poor condition.

3.2 TASK 2 - COMPILE DATABASE AND DEVELOP WORK PLANS

Monsanto proposes to conduct the following:

- Reduction of paperwork submittals to streamline process. Example: one work plan document with Sampling and Analysis Plan (SAP) for each area and common Quality Assurance Project Plan (QAPP) and Health and Safety Plan (HASP) for IEPA review and comment.

- Create summary text, tables, CADD maps from existing data to potentially be used in later report presentation.

- Work plan documents and other submittals will be prepared (i.e. SAPs, HASP, QAPP).

- Development of one overall community relations plan to cover Area 1 (see Task 7).

- Site visits to locate sampling points and identify access needs and other logistics to accomplish work plan tasks.

- Conduct Phase I ESAs on properties adjacent to Creek Segments C, D and E to determine any current dischargers or sources which could recontaminate the area after cleanup.

- Submit Work Plans and Data Report to SRP Manager.

- Meeting and conference calls with Monsanto and IEPA.

- Identify access needs, support agreements for access and other logistics to accomplish work plan tasks.

3.3 TASK 3 - PERFORM FIELD WORK

A. Baseline groundwater studies:

- Select number of shallow and deep monitoring well clusters upgradient and downgradient of Sites G, H, I, L, M, and N as part of baseline groundwater studies and to support landfill closure. Consider Sites H and I as one source for monitoring purposes.

- Complete additional hydraulic testing at selected new wells (slug tests, lab permeability, grain size, etc.) to support dewatering estimates and eventually to establish the basis for natural attenuation modeling/risk calculations.

- Complete two rounds of sampling of new monitoring wells and several existing IEPA monitoring wells within CS-B to establish pre-remediation conditions. Baseline analysis for full TCL/TAL parameters. Any long term routine monitoring would be for a reduced parameter list and monitoring well list.

B. Site G, H and I:

- Complete test pits to evaluate extent of waste.

- Carry our surface soil sampling/geotechnical data to determine cover information.

- Develop detailed topographic/aerial survey to support closure design.

- Execute soil gas survey to determine types and concentrations of landfill gases.

- Carry out limited deep soil borings for characterization of depth of waste evaluation.

- Characterize borrow source survey for cover material.

C. Creek Segments C-E (see Appendix A):

- Conduct PCB depth-profiles and sampling along creek length.
- Develop selected sediment samples analyzed for expanded parameter list;
- Develop background chemical concentrations for constituents of concern in soil/sediment.
- Complete ecological assessment of creek segments C-E.

D. Sites L, M and N:

- Complete additional characterization at Sites L and N including historical photo survey, soil borings/test trenches for determining extent of impact, soil sampling and analysis, and TCLP analysis at Site N.
- Thickness of sediment at Site M adequately characterized by G and M.

E. Creek Segments A and B:

- There is adequate chemical database for these segments. Only supplemental/confirmatory data are needed for a portion of Creek Segment B (see Appendix A).
- Collect geotechnical data and other design data.

3.4 TASK 4 - COMPILE DATA AND SUMMARIZE INTO SITE CHARACTERIZATION REPORT

- Submit characterization report to IEPA with any data gaps; obtain IEPA approval.
- Implement data gap studies - assumes supplemental studies to fill data gaps have minimal/limited scope and duration.
- Finalize reports with supplemental data.

3.5 TASK 5 - IMPLEMENT TACAO PROCESS AND DEVELOP REMEDIAL OBJECTIVES

- Propose Tiered Approach to Corrective Action Objectives (TACAO) methods and process for specific sites. Define Tier 1, 2, 3 or Toxic Substance Control Act (TSCA) and obtain IEPA approval on proposed remedial objectives (RO).
- Calculate remedial objectives, prepare report(s), obtain IEPA approval on remedial objectives.
- Depending on results of Task 4, Monsanto may propose remedial objectives for different sites at different times, as appropriate.

3.6 TASK 6 - REMEDIAL ACTION PLAN

- Assumes a single document comprised of individual source area components and a sequenced construction schedule.
- Includes regulatory and technical basis of design, conceptual designs, and remedial action schedule.
- Establish a groundwater management zone (GMZ) for Area 1 Sites.

- Includes IEPA review/revisions and approval of Remedial Action Plan.

3.7 TASK 7 - DEVELOP COMMUNITY RELATIONS PLAN AND IMPLEMENT PUBLIC MEETINGS

- Initiate Plan at the start of project.
- Obtain IEPA approval of Plan.
- Assumes quarterly public meetings and publications (Fact Sheets).

4.3 REMEDIAL IMPLEMENTATION

Monsanto's proposal for Sauget Area 1 under the SRP is similar to procedures under Superfund. The Superfund process would involve the development of a Consent Order for an RI/FS which excludes remediation. Under Superfund, a second agreement (Consent Decree) would be developed for remediation.

The SRP process under Monsanto's proposal is better than the Superfund process because Monsanto is offering to conduct all of the studies without the need for IEPA to seek out other PRPs. Under the SRP, the IEPA will receive the benefit of a $2 to $3 million RI/FS conducted by Monsanto. IEPA will retain their ability to utilize Superfund for remediation if a remediation agreement between Monsanto and the IEPA cannot be developed.

4.4 OTHER RESPONSIBLE PARTIES

Monsanto is not relying upon any other party for implementation of this proposal. This proposal will develop a remedy for Sauget Area 1. Monsanto expects that the results of the Site Investigation Report, Remedial Objectives Report and Remedial Action Plan will facilitate a discussion on responsible parties. Monsanto expects that IEPA will assist Monsanto by bringing in responsible parties. The responsibility for orphan shares would also be discussed prior to remedial implementation.

4.5 RCRA CORRECTIVE ACTION AT KRUMMRICH PLANT

IEPA's letter of November 14, 1996 states that IEPA is willing to incorporate the RCRA Corrective for the Krummrich Plant into the Consent Decree. Monsanto respectfully declines this offer on the basis that there appears to be no benefit to Monsanto for such a consolidation. However,

Monsanto is prepared to undertake Site remediation activities through the new SRP program. This proposal will be discussed separately.

4.6 PAST COSTS

Monsanto recognizes that IEPA and USEPA have incurred costs on Sauget Area 1. The appropriate timeframe to discuss reimbursement is after the characterization studies of Area 1. Once each Site has been characterized, the responsible parties will be clarified which will facilitate and expedite discussion on payment of past costs.

4.7 OVERSIGHT COSTS

Monsanto will reimburse IEPA for its oversight costs incurred during the SRP program.

4.8 SRP VERSUS SUPERFUND

Monsanto believes that the SRP offers IEPA the preferred management tool for Sauget Area 1 for the following reasons:

1. Monsanto is ready and willing to immediately implement the first three steps of the SRP program. This will develop a remedy for Area 1 in a much shorter timeframe than could be accomplished under the rigors of Superfund.

2. The SRP allows more flexibility than Superfund which will expedite the development of a remedy.

3. IEPA retains the ability to utilize Superfund at any time as an enforcement tool should IEPA not be satisfied with Monsanto's progress or willingness to implement the remedy.

REFERENCES

Ecology & Environment, Inc. (E&E). *Expanded Site Investigation Dead Creek Project Sites at Cahokia/Sauget, Illinois.* Volume 1 of 2. May 1988. 457 pages.

Geraghty & Miller, Inc. *Site Investigation for Dead Creek Sector B and Sites L and M, Sauget-Cahokia, Illinois.* March 1992. 456 pages.

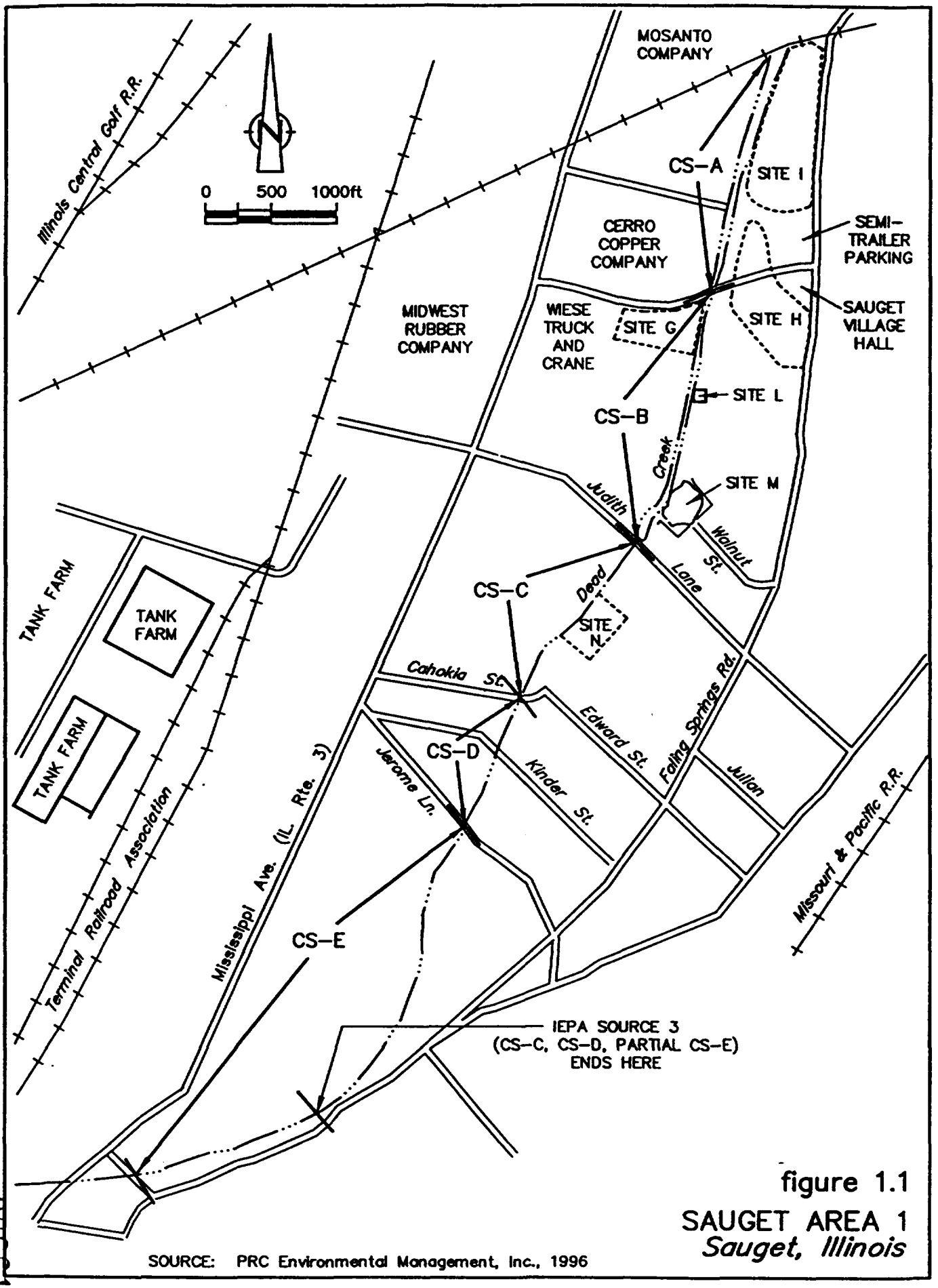


figure 1.1

SAUGET AREA 1

Sauget, Illinois

SOURCE: PRC Environmental Management, Inc., 1996

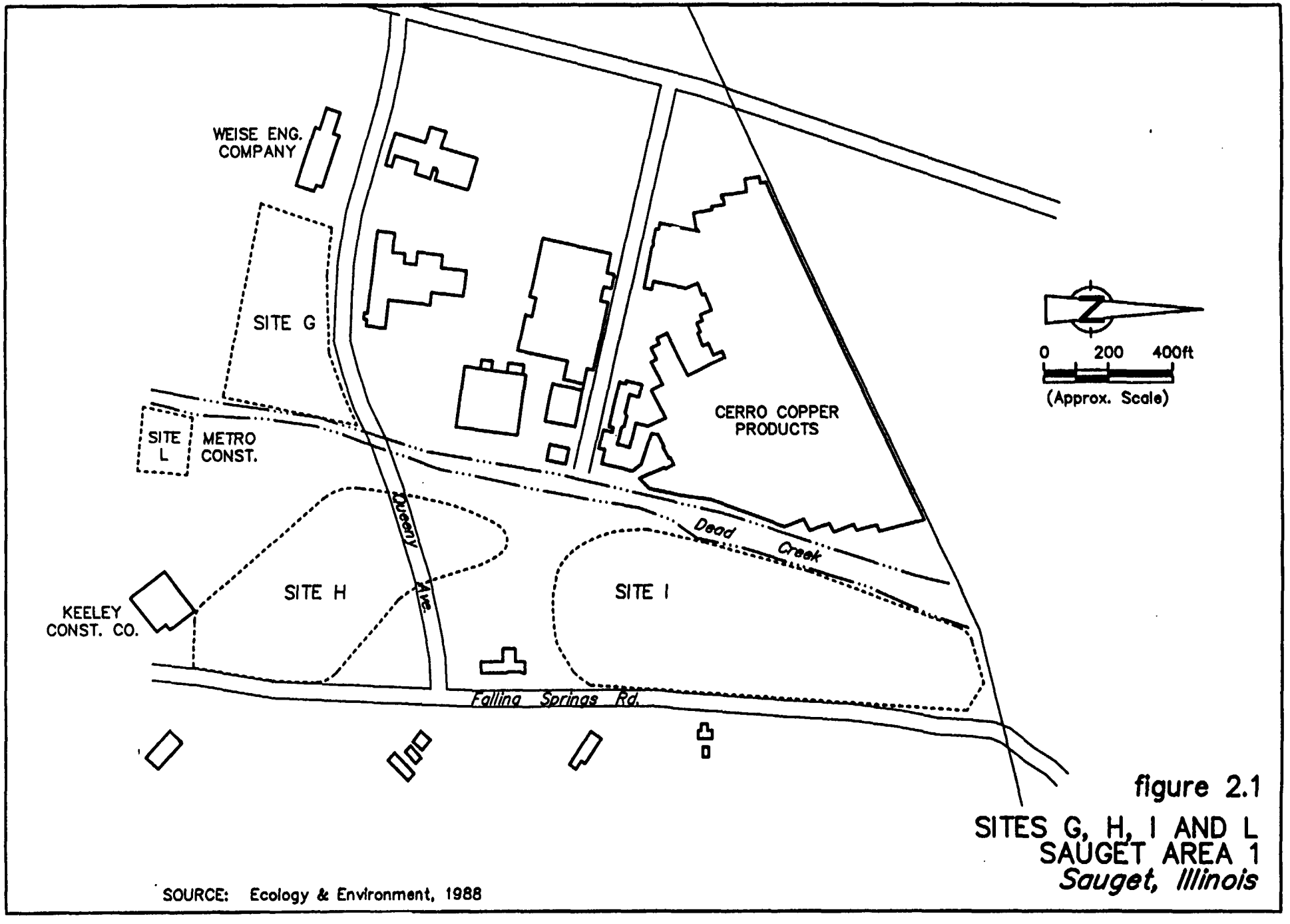
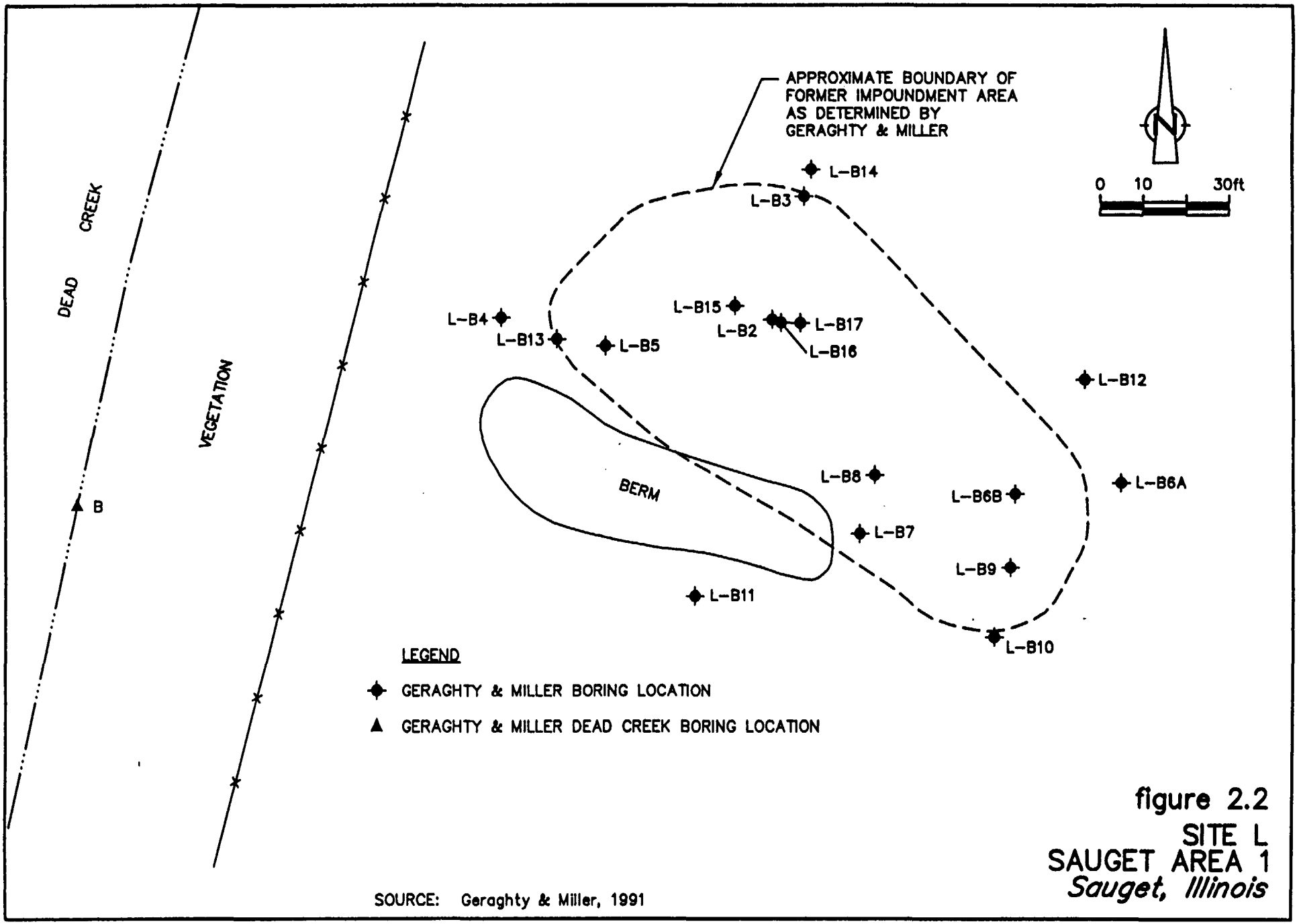


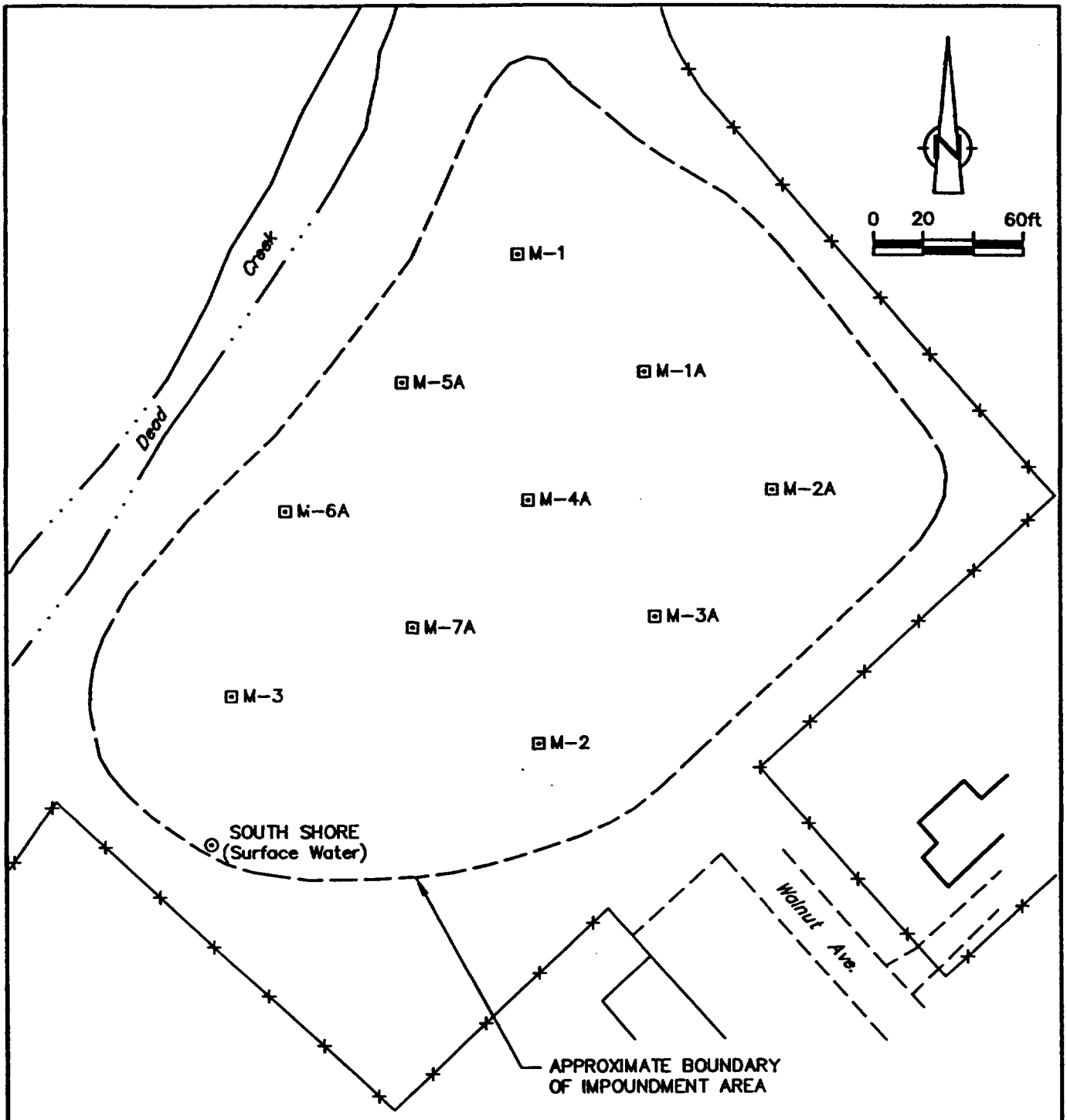
figure 2.1
SITES G, H, I AND L
SAUGET AREA 1
Sauget, Illinois

SOURCE: Ecology & Environment, 1988



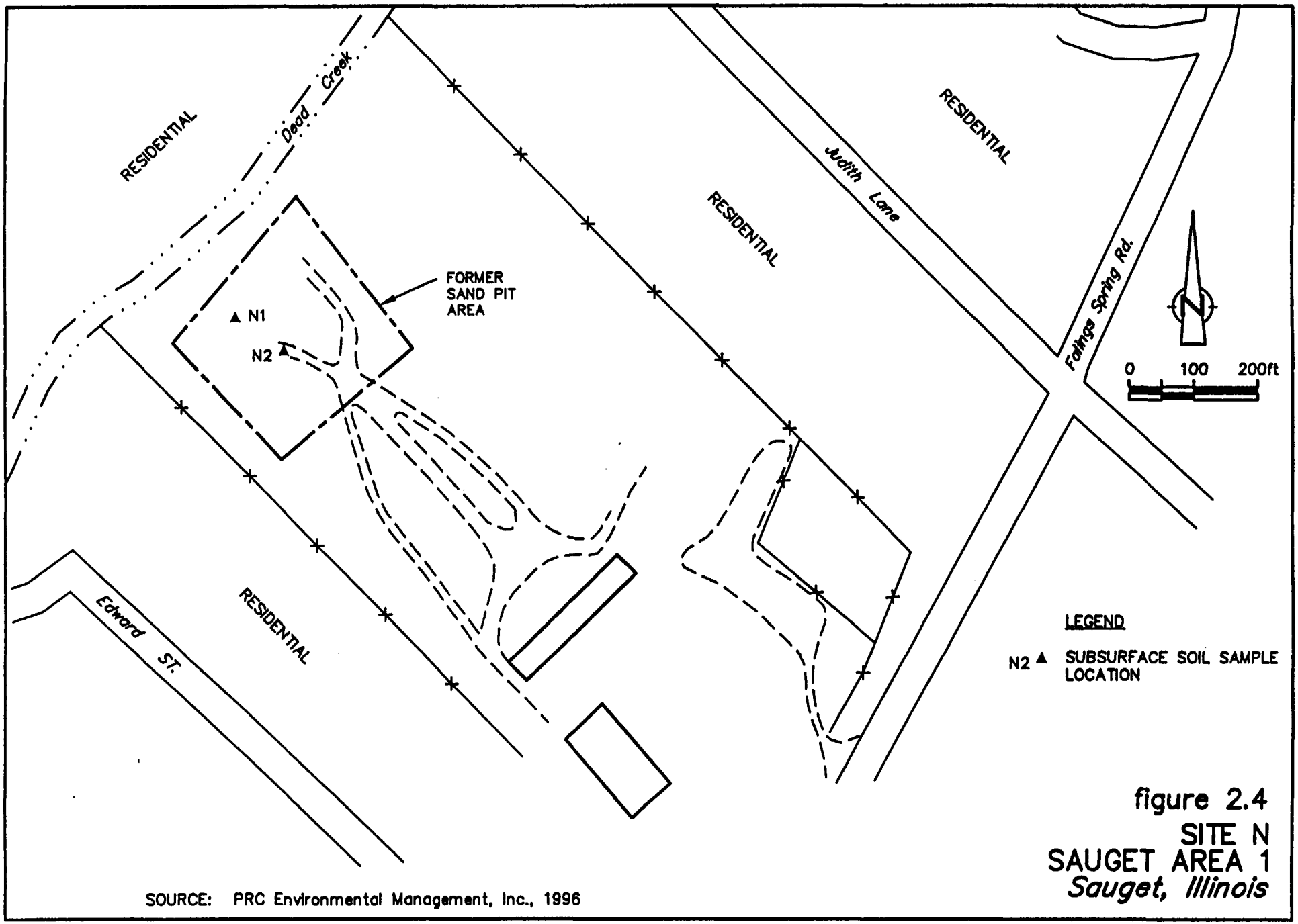
SOURCE: Geraghty & Miller, 1991

figure 2.2
SITE L
SAUGET AREA 1
Sauget, Illinois



SOURCE: Geraghty & Miller, 1991

figure 2.3
SITE M
SAUGET AREA 1
Sauget, Illinois



SOURCE: PRC Environmental Management, Inc., 1996

figure 2.4
SITE N
SAUGET AREA 1
Sauget, Illinois

TABLE 4.1

PROPERTY OWNERSHIP [1]
SAUGET AREA 1 SITES

Site Designation	*Parcel/Tax I.D.#*	*Assumed Ownership of Area I Site or Parcel Abutting Creek Segment*	*Access Agreement with Monsanto*
Creek Segment A	1-26-400-013	Cerro Copper Products Company	None
	1-26-400-014	Cerro Copper Products Company	None
	1-26-402-012	Cerro Copper Products Company	None
	1-26-402-016	Cerro Copper Products Company	None
Creek Segment B	1-35-200-005	Rose Stillman	Access obtained in past
	1-35-200-034	Tony L. Lechner	None
	1-35-200-013	Ruan Transport Corporation	Access obtained in past
	1-35-200-031	Ruan Transport Corporation	Access obtained in past
	1-26-401-007	Moto-Gas	Access obtained in past
	1-26-401-008	Moto-Gas	Access obtained in past
	1-26-401-009	Moto-Gas	Access obtained in past
	1-26-401-003	Harold Wiese	Access obtained in past
	1-26-401-004	Harold Wiese	Access obtained in past
	1-26-401-011	Myrtle Hankins	None
	1-26-401-006	Andrew Hankins	None
	1-35-201-001	Thomas Owen	Access obtained in past
	1-35-202-001	Thomas Owen	Access obtained in past
	1-35-202-016	Albert Lauman III	None
	1-35-102-003	Robert Clarkson	None

TABLE 4.1

PROPERTY OWNERSHIP [1]
SAUGET AREA 1 SITES

Site Designation	*Parcel/Tax I.D.#*	*Assumed Ownership of Area I Site or Parcel Abutting Creek Segment*	*Access Agreement with Monsanto*
Creek Segment C	1-35-102-003	Amrut and Sita Patel	None
	1-35-106-002	Steve and Constance Christie	None
	1-35-106-003	Louis and Paulyne Shepard	None
	1-35-106-004	Thomas E. Vice, Jr.	None
	1-35-106-005	Gail D. Mitchell, Jr. and Kenneth and Judy Rickert	None
	1-35-106-006	Ernest and Marjorie Brown	None
	1-35-106-007	Susan and Terry Allen	None
	1-35-106-008	Winfred and Anna Kuntz	None
	1-35-106-009	John and Linda Collins	None
	1-35-106-010	Jerry Lee Wyatt and Harlene Laverne Wyatt	None
	1-35-106-011	Brodie H. Smith, Jr.	None
	1-35-106-012	Ronald and Deborah Oestricker	None
	1-35-106-013	Ronald and Deborah Oestricker	None
	1-35-107-015	Betty A. Brand	None
Creek Segment D	1-35-108-016	Robert and Virginia Grider	None
	1-35-108-030	Ray and Gloria Jordan	None
	1-35-306-003	Billy Eugene and Corrine Thomas	None
	1-35-306-004	Billy Eugene and Corrine Thomas	None
	1-35-306-005	Stanley and Gwendlyn Martka	None
	1-35-306-006	Ruth Jones	None
	1-35-306-007	Stanley Martka	None
	1-35-306-008	Virgil Ray Moore and Karril Lea Moore	None

TABLE 4.1

PROPERTY OWNERSHIP [1]
SAUGET AREA 1 SITES

Site Designation	*Parcel/Tax I.D.#*	*Assumed Ownership of Area I Site or Parcel Abutting Creek Segment*	*Access Agreement with Monsanto*
Creek Segment D (cont'd)	1-35-306-011	St. Clair County, Illinois	None
	1-35-203-001	Robert and Janet Wright	None
	1-35-204-006	St. Clair County, as Trustee	Access obtained in past
	1-35-205-002	Clarence Edward Price and Linda S. Price	None
	1-35-205-003	Beryl George Ryan and Agnes Ryan	None
	1-35-308-019	Robert Joseph Risse and Betty Lou Risse	None
	1-35-308-020	Richard Allen Gray and Rhonda Kay Gray	None
	1-35-308-041	Martha H. Dolios	None
	1-35-308-042	Michael W. Favies and Robert J. Faries	None
	1-35-309-001	Billy and Terry Thomas	None
	1-35-309-002	Lisa Willingham and Martha Fleming	None
	1-35-309-016	Paul and Virginia Chapman and Frieda Sue Dallas	None
Creek Segment E	No information available		
Landfill G	1-26-401-003	Harold W. Wiese	None
	1-26-401-004	Harold W. Wiese	None
	1-26-401-011	Myrtle Hankins	None
	1-26-401-006	Andrew Hankins	None
	1-26-401-007	Moto-Gas, Inc.	Access obtained in past
Landfill H	1-26-402-012	Cerro Copper Products Company	None
	1-26-402-016	Cerro Copper Products Company	None

TABLE 4.1

PROPERTY OWNERSHIP [1]
SAUGET AREA 1 SITES

Site Designation	*Parcel/Tax I.D.#*	*Assumed Ownership of Area I Site or Parcel Abutting Creek Segment*	*Access Agreement with Monsanto*
Landfill I	1-26-402-013	James Tolbird	None
Former Impoundment L	1-35-200-013	Ruan Transport Corporation	Access obtained in past
	1-35-200-031	Ruan Transport Corporation	Access obtained in past
Impoundment M	1-35-201-001	Thomas Owen	Access obtained in past
	1-35-202-001	Thomas Owen	Access obtained in past
Landfill N	1-35-204-006	St. Clair County, as Trustee	Access obtained in past

Notes:
(1) Information obtained from Monsanto project files dated 1990 or before for CS-A, CS-B, Sites G, H, I, L and M, and 1996 for CS-C, CS-E and Site N.

APPENDIX A

DRAFT WORK PLAN
PREDESIGN INVESTIGATION
DEAD CREEK SECTORS B, C, D AND E

WORK PLAN
PREDESIGN INVESTIGATION
DEAD CREEK SECTORS B, C, D AND E

Sauget, Illinois

Prepared for:
Monsanto Corporation

DRAFT

MARCH 1997
This report printed on recycled paper

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1.0 INTRODUCTION

1.1 GENERAL

This Work Plan outlines the objectives, approach and general methods to investigate the sediments in Creek Sectors C, D, E and the northern portion of Sector B of Dead Creek located in Sauget, Illinois (see Figure 1.1). This Work Plan will be supported by other project plans including a Site Sampling and Analysis Plan (SAP), a Health and Safety Plan (HASP) and a Quality Assurance Project Plan (QAPP), community relations and data management. A plan illustrating Dead Creek (Creek) Sectors A through E is presented in Figure 1.1. Previous studies conducted in the Creek have identified creek sediments with polychlorinated biphenyls (PCBs), a variety of other organic compounds and heavy metals. The overall objective of the predesign investigation will be to gather sufficient information to complete an evaluation of Creek Sectors C, D, E and the northern portion of Sector B for the purpose of assessing Site risk and ultimately selecting an appropriate remedy. The focus of these predesign investigations is to obtain data necessary to evaluate health risks associated with the impacted creek sediments and soils.

The predesign investigation presented in this Work Plan addresses investigative activities within Creek Sectors C, D, E and the northern portion of Sector B. Previous investigations have been performed in Creek Sector A, by the Avendt Group, Inc. in 1990 (for Cerro Copper) and in Sector B, by Geraghty & Miller (G&M), in 1991 (for Monsanto), and in Sectors A, B, C and D, by Ecology & Environment (E&E), in 1988. G&M were unable to obtain access to the northern 450 feet of Creek Sector B during their 1991 investigation. This predesign investigation will attempt to obtain access to this portion of the Creek to obtain sediment samples to characterize this portion of the Creek.

1.2 BACKGROUND

This section provides a brief summary of conditions at each of the four sectors of the Creek to be investigated as part of this program. Creek Segments B through E extend from Queeny Avenue on the north to the culvert at State Route 3 (see Figure 1.1).

Creek Sector B is bordered to the north by Queeny Avenue and on the south by Judith Lane. It is approximately 1,950 feet in length and between 5 and 56 feet wide. Only the northern 450 feet of this Creek Sector will be addressed during the predesign investigation. Creek Sector CS-C is bordered on the north by Judith Lane and on the south by Cahokia Street. It is approximately 1,300 feet in length and 75 feet wide. Creek Sector CS-D is bordered on the north by Cahokia Street and on the south by Jerome Street. It is approximately 1,100 feet in length and 75 feet wide. Creek Sector CS-E is bordered on the north by Jerome Street and extends to the south to the park at State Route 3 and 157. It is approximately 3,500 to 4,000 feet in length and 75 feet wide.

Creek sectors C through E are generally wider and contain more water than Creek Sectors A and B. They are bordered primarily by residential property. Surface water can flow from one sector to the other via culverts under the roads separating each segment.

Sediment samples collected within Creek Sectors C, D and E have shown concentrations of PCBs ranging from 0.12 to 28 milligrams per kilogram (mg/kg). Concentrations of PCBs in Creek Sector B ranged from non-detect to 440 mg/kg. Inorganic constituents of concern include antimony, arsenic, barium, lead, mercury, nickel, selenium and zinc. Surface water samples collected within Creek Sectors C, D and E have not indicated elevated concentrations compared to concentrations identified in upstream segments.

No remedial activities have taken place along Creek Sectors B through E. Access to Creek Sector B is restricted by an 8-foot chain link fence. Creek Sectors C through E are generally free to public access and appear to support normal vegetative growth and biological habitats.

1.3 CONSTITUENTS OF CONCERN

The constituents of concern in the sediments of Creek Sectors B, C, D and E were determined through the evaluation of the analytical data compiled during previous investigations. Analytical data obtained from the

investigations conducted by E&E (1988) during which sediment samples were collected from Creek Sectors A through D and G&M (1991) during which sediment samples were collected from Creek Sector B, were reviewed to identify the constituents of concern.

PCBs were detected in most of the sediment samples analyzed at concentrations ranging from non-detect to 440 mg/kg. Therefore, PCBs are considered to be the primary constituents of concern within the creek sediments. Table 1.1 provides a summary of the remaining compounds detected, and the maximum concentrations detected during the previous investigations. An initial comparison to cleanup objectives was made as a preliminary screening for indicator chemicals and potential constituents of concern. Based on this screening, it was determined that polyaromatic hydrocarbons (PAHs) and metals are considered to be secondary compounds of concern. Consequently, this predesign investigation will address specifically the nature and extent of PCBs, PAH and metals in the sediments located within Creek Sectors C, D and E and the northern portion of Sector B.

2.0 PROJECT OBJECTIVES

The strategy outlined in this Work Plan is based on obtaining the information necessary to fulfill four primary objectives of the predesign investigation program. These objectives are as follows:

1. determine the lateral (downstream) distribution of potential constituents of concern within the sediments of Creek Sectors C, D and E and the northern portion of Sector B;

2. determine the vertical distribution of potential constituents of concern within the sediments of Creek Sectors C, D and E and the northern portion of Sector B;

3. obtain the data necessary to evaluate remedial alternatives; and

4. collection of sediment data which will allow preliminary comparisons to, or calculation of, risk-based corrective action objectives under Tiered Approach to Corrective Action Objectives (TACAO).

A summary of the data objectives and requirements are presented in Table 2.1. The following section describe the investigative activities to be undertaken to fulfill the objectives of the predesign investigation.

3.0 SCOPE OF WORK

The scope of work (SOW) to be undertaken to fulfill the objectives of the sediment investigation program will consist of the following major tasks:

1. Implementation of a soil boring program consisting of the installation of a series of soil borings along the length of Creek Sectors C, D and E and in the northern portion of Sector B. Sediment samples will be collected and analyzed to determine the lateral distribution of compounds along the Creek.

2. Sediment samples will be collected from several depth intervals within the Creek to determine the vertical distribution of compounds.

3. Sediment samples will be composited and collected for waste characterization analyses to evaluate excavation, containment or disposal as a remedial option.

4. Sediment samples will be collected and composited for geotechnical analyses and bench-scale testing to evaluate sediment solidification/stabilization as a remedial option.

5. The collected analytical and geotechnical data will be used to assess the appropriate tier of analyses for establishing corrective action objectives under the TACAO process, (including Tier I, II or III).

3.1 SOIL BORING PROGRAM

Sediment samples will be collected from soil borings installed along series of profiles that transect along the length of each of the Creek Sectors. The spacing between the profiles of soils borings will be approximately 200 feet. The actual distance between the profiles may vary due to physical restrictions and/or property access restrictions. Each profile will consist of three soil borings installed across the width of the Creek. The number of soil borings per profile may be reduced to two, if the width of the Creek is less

than 30 feet at a proposed profile location. The spacing between soil borings in the same profile will be approximately 15 feet. This sampling network is similar to the networks utilized by the Avendt Group, Inc. (1990) in Sector A and G&M (1991) in Sector B of Creek. The proposed sampling network for Creek Sectors B, C, D and E are presented on Figures 3.1, 3.2, 3.3 and 3.4, respectively.

The sediment sampling program will begin at the southern-most portion of Sector E and proceed in a northerly direction into Sectors D and C and the northern portion of Sector B. This south to north sampling progression will reduce the likelihood of disturbing and mobilizing affected sediments from upstream areas into downstream areas.

Soil borings will be advanced using an all-terrain vehicle (ATV), track-mounted drill rig equipped to use hollow stem augers (HSA). However; split spoon samplers may need to be manually advanced at locations inaccessible to the ATV rig. In the event that the majority of the sampling locations are inaccessible to the ATV drilling, a drill rig mounted on a pontoon may be utilized. Sediment samples will be collected using continuos core sampler and split spoon samplers. Collected sediment samples will be visually inspected by a qualified CRA geologist and described in accordance with the Unified Soil Classification System (USCS). Sediment samples will also be screened for the presence of organic vapors using a photoionization detector (PID) and head space monitoring techniques.

Sediment samples will be retained for chemical analyses from all of the soil borings. Samples from the 0 to 2.0, 2.0 to 4.0 and 6.0 to 8.0 foot below ground surface (bgs) intervals will be analyzed for PCBs. Sediments from the 0.0 to 2.0 foot interval, from the center profile soil boring will also be analyzed for PAHs and priority pollutant metals. This sampling methodology will provide a good vertical profile of chemical concentrations within the shallowest creek sediments where the majority of impacts are expected. Figure 3.5 illustrates the proposed profile sampling program.

Boreholes will be backfilled with granular bentonite to prevent downward migration into underlying sediments.

Specific details outlining the drilling, equipment cleaning and sampling procedures will be provided in the SAP and QAPP.

3.2 WASTE CHARACTERIZATION

During the soil boring program, sediment samples from every three to four profiles will be composited into one waste characterization sample. The waste characterization sample will be analyzed for TCL/TAL parameters utilizing the Toxicity Characteristic Leaching Procedure (TCLP) methods and for reactivity, ignitability and pH. These data will be used to evaluate containment or disposal of the impacted sediments as a remedial option.

Specific details outlining the drilling, sampling and analytical procedures will be provided in the SAP and QAPP.

3.3 SOLIDIFICATION/STABILIZATION

Sediments will be collected and/or composited for possible future treatability testing and possible bench scale testing to evaluate sediment solidification/stabilization as a remedial option. Testing may include evaluation of several potential solidification/stabilization admixtures. Treatability studies would be designed and performed consistent with the intent of the USEPA and IEPA guidelines for treatability studies.

Specific details outlining the drilling, sampling and treatability procedures will be provided in the SAP and QAPP.

3.4 PHYSICAL TESTING

During the soil boring program, sediment samples will be collected for physical testing to facilitate future TACAO evaluations. The physical testing will consist of collecting sediment samples for grain-size, bulk density, total organic carbon, soil pH and moisture content analyses. The

sediment samples for physical testing will be collected at 400 foot intervals along Creek Sectors C, D and E and from the northern portion of Sector B. Sediment samples will be collected from the 0 to 2.0 and 2.0 to 4.0 foot bgs intervals using Shelby tube or similar type samplers. Samples will be submitted to a geotechnical laboratory for testing.

Specific details outlining the drilling, sampling and testing procedures will be provided in the SAP and QAPP.

4.0 SUBMITTALS

4.1 ADDITIONAL PROJECT PLANS

Prior to undertaking the predesign investigation program additional project plans will be developed to provide detailed description of field activities and laboratory testing procedures and health and safety issues. The additional project plans to be developed are:

- Sampling and Analyses Plan (SAP);
- Quality Assurance Project Plan (QAPP);
- Health and Safety Plan (HASP);
- Data Management Pan; and
- Community Relations Plan.

The project plans will be developed in accordance with USEPA and/or IEPA guidelines for such plans. Copies of the project plans will be submitted to the IEPA for review.

4.2 DATA REPORT

Following the completion of the predesign investigation program a Data Summary Report (Report) will be prepared which will present the findings for the predesign investigation. The Report will summarize all data collected and analyses performed. Copies of the report will be submitted to the IEPA for review.

Data obtained during the predesign investigation will be used to assess the appropriate tier of analyses for establishing corrective action objectives under the TACAO process, (Tier I, II and II). The risk- based approach used in the TACAO process will be applied to each Creek Sector using realistic assumptions regarding current and future uses of the Creek and surrounding areas. In addition, a Sensitive Environments Study of the Creek and surrounding area may be completed to evaluate ecological effects and to support the TACAO process.

Geotechnical, chemical, waste characterization and treatability testing data collected during the sediment investigation program will (if necessary) be used to conduct a feasibility study of remedial alternatives. This evaluation will include the evaluation of containment, excavation and disposal and solidification/stabilization as possible remedial options. The feasibility study will also evaluate natural attenuation as a viable remedial option.

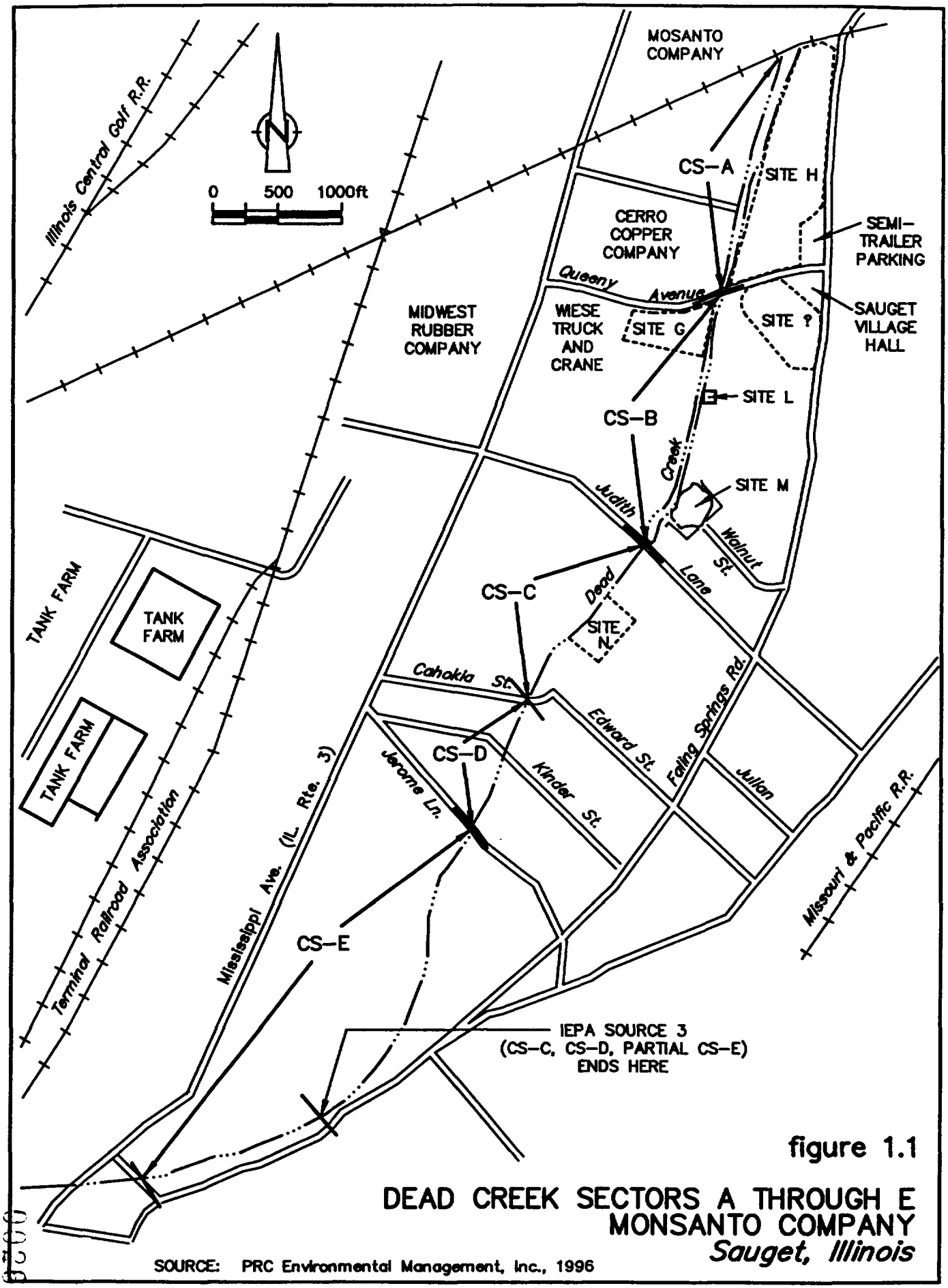


figure 1.1

DEAD CREEK SECTORS A THROUGH E
MONSANTO COMPANY
Sauget, Illinois

SOURCE: PRC Environmental Management, Inc., 1996

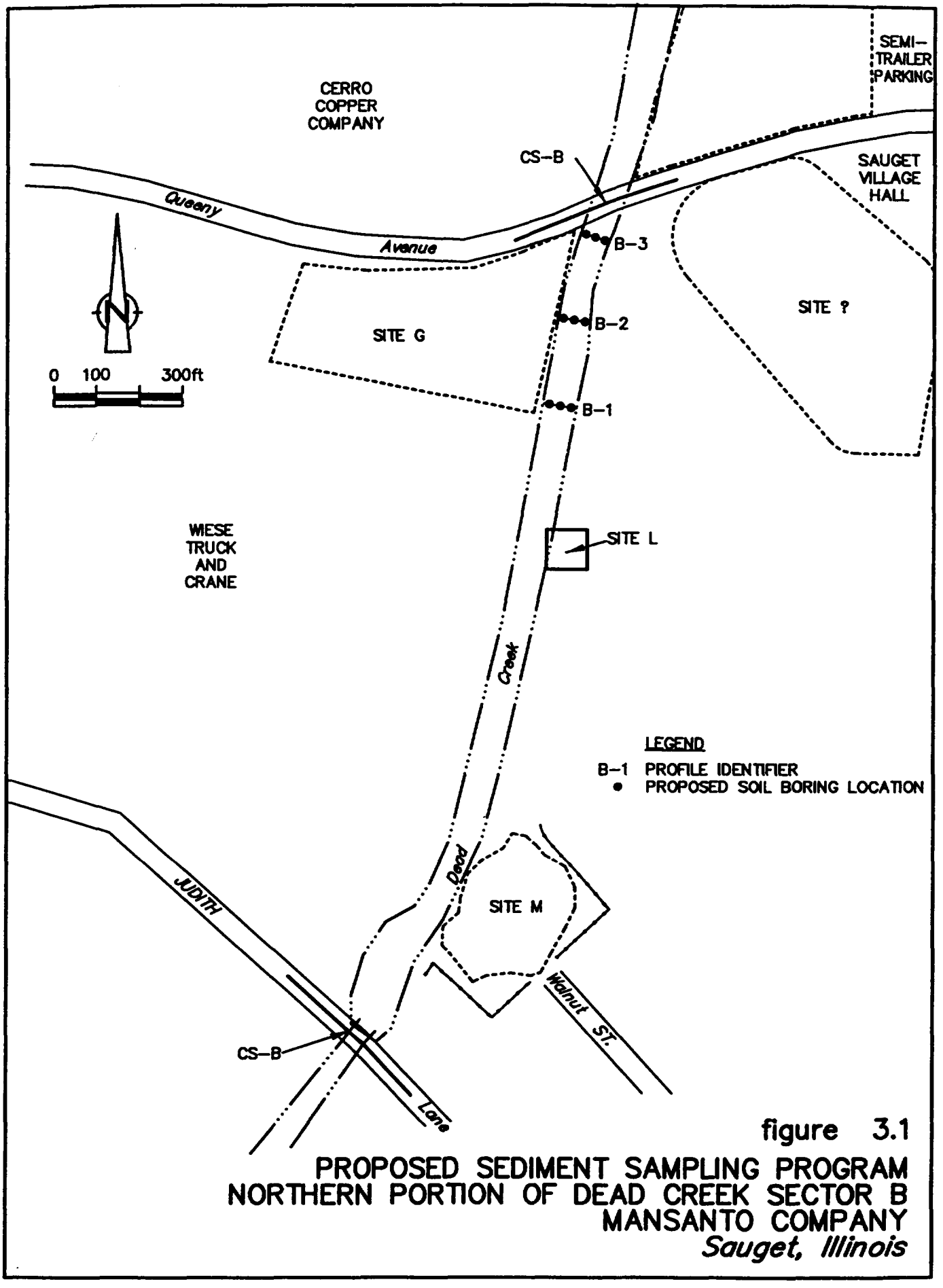


figure 3.1

PROPOSED SEDIMENT SAMPLING PROGRAM
NORTHERN PORTION OF DEAD CREEK SECTOR B
MANSANTO COMPANY
Sauget, Illinois

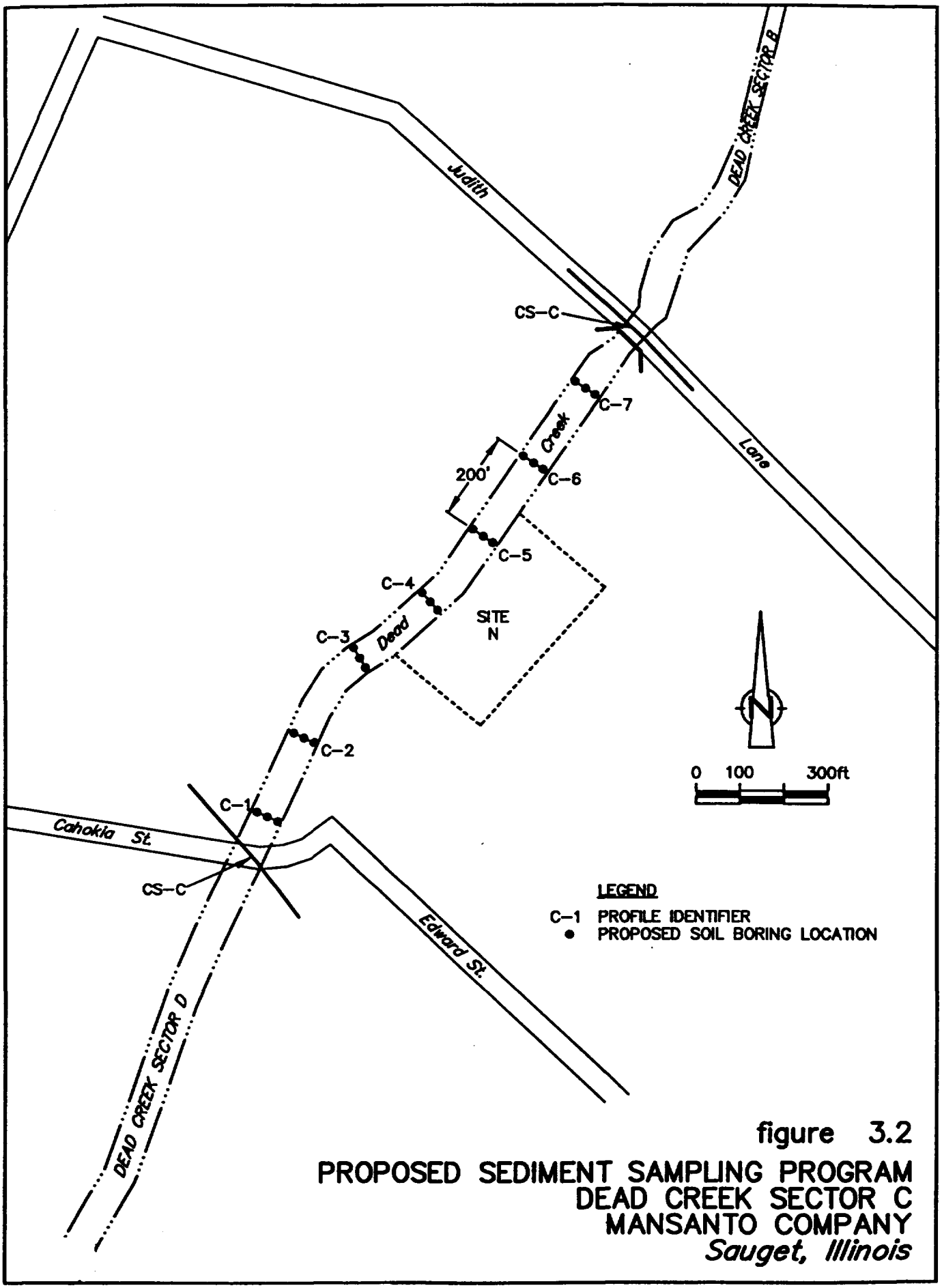


figure 3.2

PROPOSED SEDIMENT SAMPLING PROGRAM
DEAD CREEK SECTOR C
MANSANTO COMPANY
Sauget, Illinois

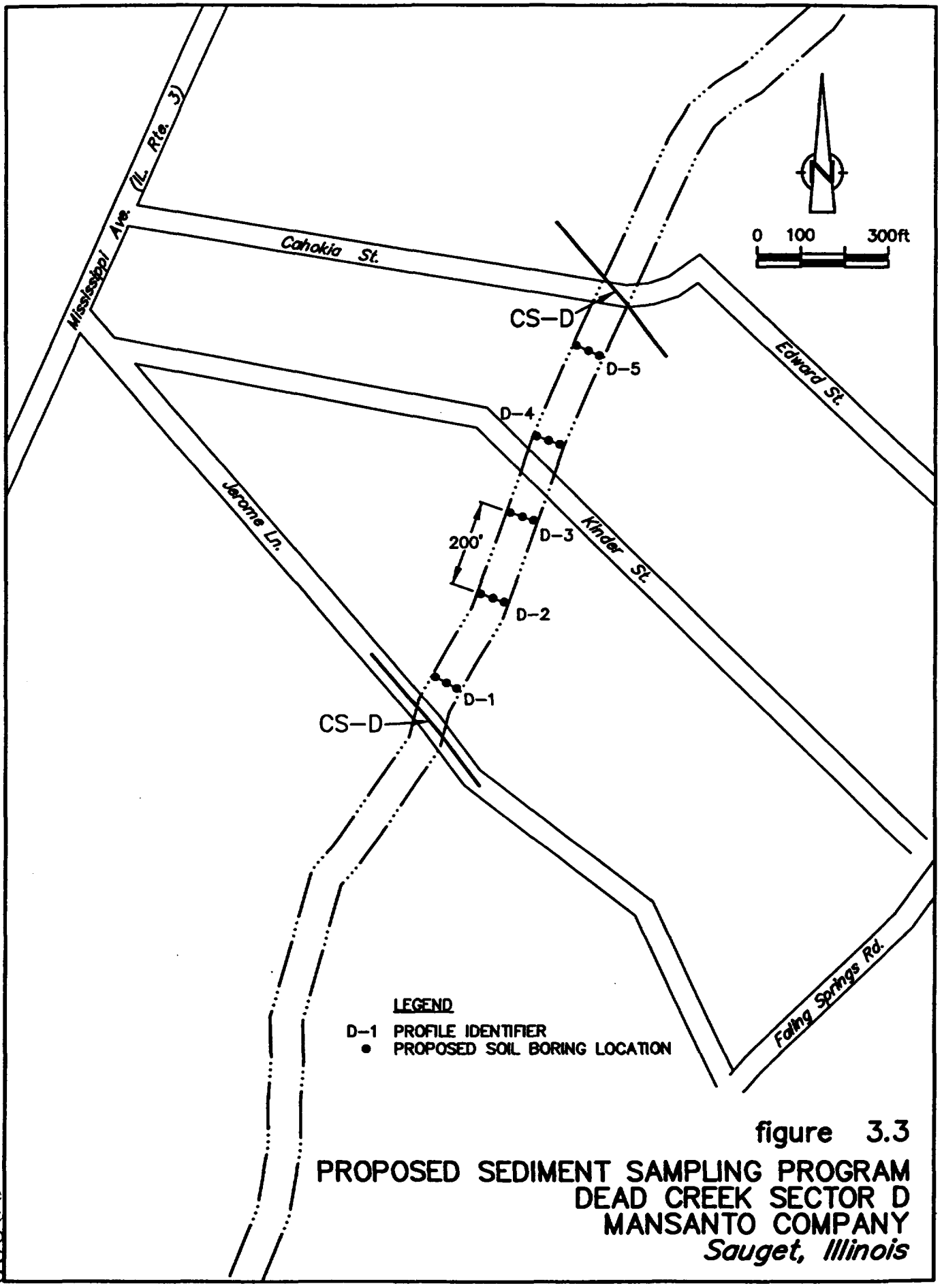


figure 3.3

PROPOSED SEDIMENT SAMPLING PROGRAM
DEAD CREEK SECTOR D
MANSANTO COMPANY
Sauget, Illinois

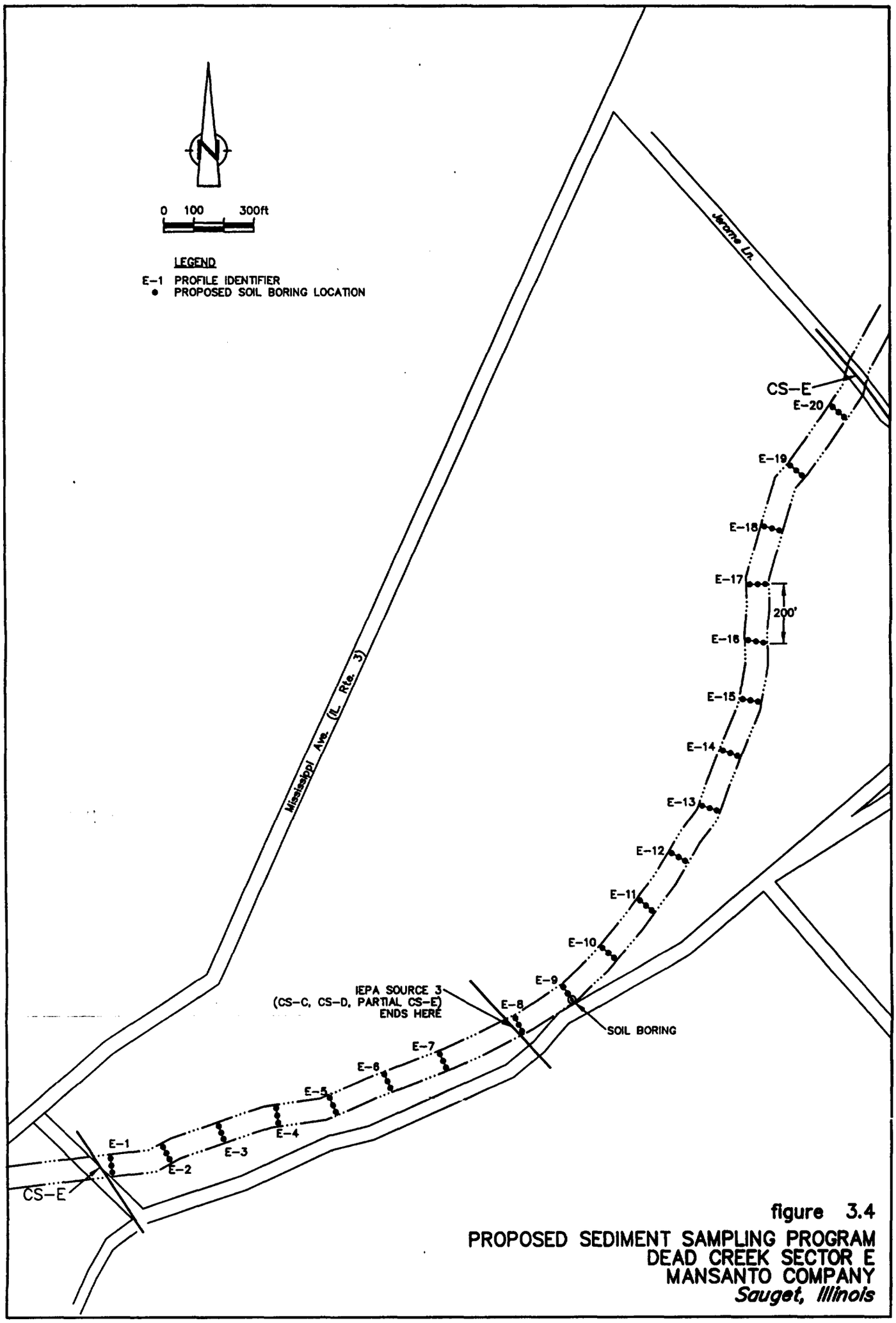


figure 3.4

PROPOSED SEDIMENT SAMPLING PROGRAM
DEAD CREEK SECTOR E
MANSANTO COMPANY
Sauget, Illinois

TABLE 1.1

SUMMARY OF MAXIMUM CONCENTRATIONS OF COMPOUNDS DETECTED IN CREEK SEDIMENTS PREDESIGN INVESTIGATION DEAD CREEK SECTORS B, C, D AND E SAUGET, ILLINOIS

Constituent	*Maximum Concentration Detected Geraghty & Miller 1991 Creek Sector B*	*Maximum Concentrations Detected Ecology and Environmental 1988 Creek Sectors A, B,C, and D*
Pentachlorophenol	2.9	0.94J
Phenanthrene	6.4	
Phenol	ND	
Pyrene	17E	13J
Trichlorobenzene	12	
Trichlorophenol, 2,4,5-	0.096J	
Trichlorophenol, 2,4,6-	1.4	Metals Sector B only
Inorganics		
Aluminum	49,200	12,900
Antimony	44.5J	
Arsenic	198J	20R
Barium	9510J	17,300
Cadmium	243J	36
Calcium	23,600	
Chromium, total	296	153 (trivalent)
Cobalt	29.9	11
Copper	30,100	15,300*
Cyanide	17.4	3.8
Iron	86,400	58,200
Lead	2,660	1,460
Magnesium	8,290	
Manganese	702J	218
Mercury	5	1.68
Nickel	2,670	1,520R [1]
Potassium	3,100	
Selenium	9.45J	4.1
Silver	50	15
Sodium	1,464	
Vanadium	5959.6	48
Zinc	42,800	11,900

Notes:

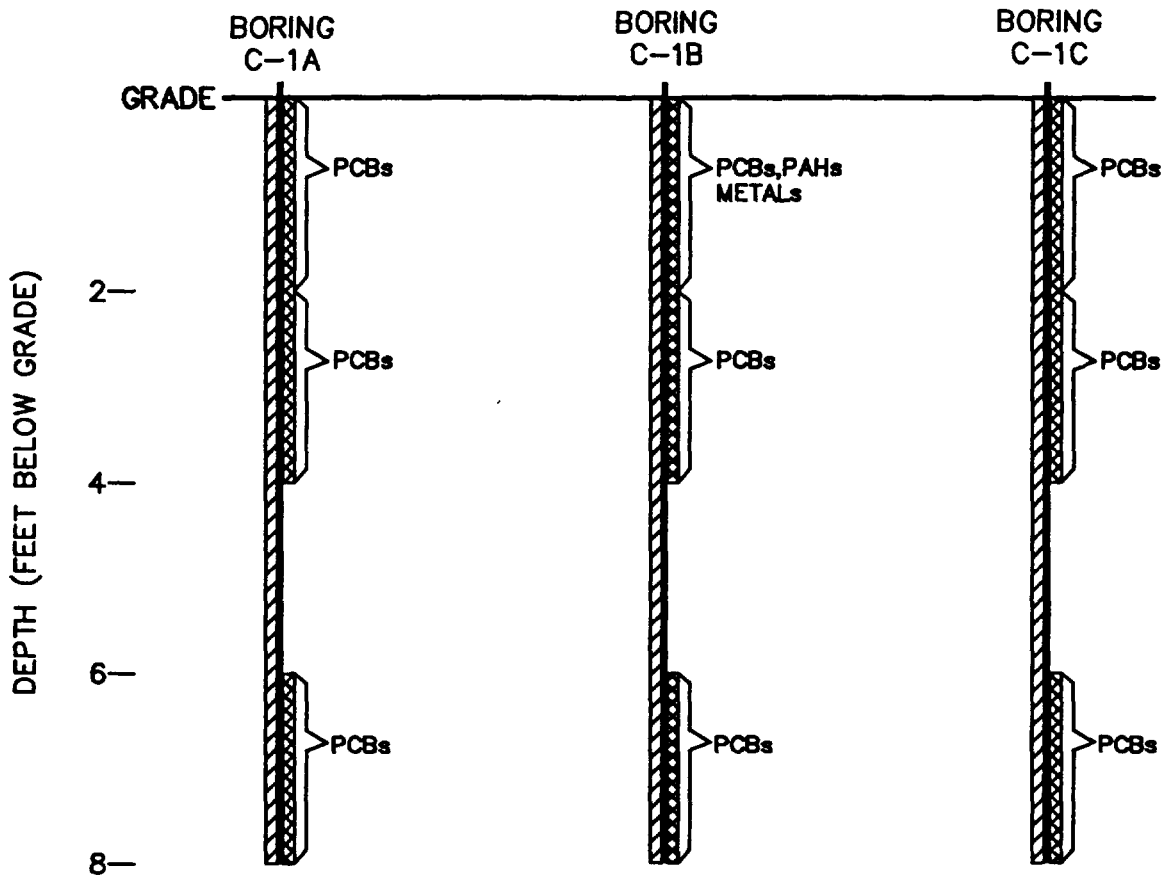
ND - Not Detected

J - Estimated Concentration

E - Compound concentration exceeded the calibration range of the instrument

R - Spike recovery date not within control limits

(1) Duplicate not within control limits



LEGEND:

SAMPLE INTERVAL TO BE ANALYZED FOR THOSE PARAMETERS LISTED ADJACENT TO INTERVAL

SAMPLE INTERVALS WHICH WILL BE COMPOSITED FROM GRADE TO A DEPTH OF EIGHT FEET FOR ANALYSIS OF TCLP PARAMETERS, REACTIVITY, CORROSIVITY, AND IGNITABILITY

PAH	POLYAROMATIC HYDROCARBONS
PCBs	POLYCHLORINATED BIPHENYLS
METALS	PRIORITY POLLUTANT METALS

figure 3.5

VERTICAL PROFILE FOR PROPOSED SEDIMENT SAMPLING PROGRAM–DEAD CREEK MONSANTO COMPANY *Sauget, Illinios*

TABLE 1.1

SUMMARY OF MAXIMUM CONCENTRATIONS OF
COMPOUNDS DETECTED IN CREEK SEDIMENTS
PREDESIGN INVESTIGATION
DEAD CREEK SECTORS B, C, D AND E
SAUGET, ILLINOIS

Constituent	*Maximum Concentration Detected Geraghty & Miller 1991 Creek Sector B*	*Maximum Concentrations Detected Ecology and Environmental 1988 Creek Sectors A, B,C, and D*
VOCs		
Acetone	1.7J	
Carbon disulfide	0.063J	
Chlorobenzene	13DJ	5.2
Ethylbenzene	0.044J	
Tetrachloroethene	0.03J	
Toluene	5.3J	
Trichlorobenzene, 1,2,4-	12	5.4
Xylene (total)	0.36	
SVOCs/PAH		
Acenaphthene	2.6	
Acenaphthylene	0.96J	
Anthracene	2.7	
Benzo (b)Fluoranthene	30	7.5
Benzo (g,h,i)Perylene	13	
Benzo (k) Fluoranthene	15	
Benzo(a)Anthracene	5.4	3.3
Benzo(a)Pyrene	10	4.5
Bis(2-Ethylhexyl)phthalate	12B	
Chloroaniline, p- (4)	ND	
Chlorophenol, 2-	0.46J	
Chrysene	9.4	
Dibenzofuran	2.0	
Dibenzo(a,h) Anthracene	3.9J	4
Dichlorobenzene (1,2) (-o)	11	17
Dichlorobenzene, (1,4) (-p)	12	220
Dichlorobenzene (1-3)	2	
Dichlorophenol, 2,4-	0.88	
Dimethylphenol, 2,4-	0.14J	
Fluoranthene	5.4J	
Fluorene	4.6	
Hexachlorobenzene	0.11J	
Indeno(1,2,3,c,d)Pyrene	9	
Isophorone	0.27J	
Methylphenol-4	0.12J	
Methylnaphthalene-2	7	
N-Nitrosodi-n-propylamine	0.76	
Naphthalene	5.1J	9.4